application shaft 8 so that rotation of the rotary shaft 5 and the ball nut 7 causes reciprocating motion of the movable arm 8 including the screw 9 integrally provided therewith. Thus, the ball nut 7 rotates with the hollow rotary shaft 5. Element 10 is a welding electrode secured to an end of the moving arm 8.

Applicant's independent Claims 3-5 all recite "a nut fixed with the force application shaft and threadably engaged with a screw of the screw shaft". For example, see nut 33 in Figure 3 which is fixed to the force application shaft 9 and threadably engaged with a screw of the screw shaft 7. This physical arrangement is not present in Obara or Fukaya.

The rejection interprets the elements of Obara as follows. The rejection states that Obara discloses a screw shaft 9 coaxially fixed with a rotary shaft 5 of the motor, a nut 7 fixed with the force application shaft 9 and threadably engaged with a screw of the screw shaft 9. Thus, in the rejection, element 9 is both a force application shaft and a screw shaft. Further, the Office Action indicates the ball nut 7 is fixed with the force application shaft 9. This interpretation is traversed.

The nut 7 in Obara is fixed to the rotary shaft. Thus rotation of the rotor 5 and ball nut 7, which are integral with each other, provides reciprocal movement of the screw shaft 9. Therefore, the nut 7 of Obara is not fixed with the force application shaft as recited in Applicant's independent Claims 3-5.

Further, it is unclear how element 9 of Obara can represent both a screw shaft and a force application shaft.

Independent Claims 3-5 also recite that "the screw shaft is integrally provided on the rotary shaft". This is shown, for example, in Applicant's Figure 2 where the rotary shaft 5 and screw shaft 7 are integral with each other. The Office Action indicates that in Obara the screw shaft 9 is integrally provided on the rotary shaft 5 of the motor. This statement is traversed. In Obara the screw shaft 9 is received within the rotary shaft 5 of Obara. However, the screw shaft 9 of Obara moves in a reciprocating linear direction in response to rotation of the rotary shaft 5. Thus, the screw shaft of

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Obara is not integrally provided on the rotary shaft as claimed by Applicant. In Applicant's claimed invention only the force application shaft is provided with reciprocating movement.

Independent Claim 3 further recites that "the screw shaft is integrally provided on the rotary shaft of the motor by boring a closed bore hole at an output side of the rotary shaft of the motor, and inserting one end of the screw shaft into the closed bore hole". This arrangement is not present in Obara. The Office Action states that the screw shaft 9 of Obara is integrally provided on the rotary shaft of the motor by boring a closed bore hole at an output side of the rotary shaft 5 of the motor and inserting one end of the screw shaft into the closed bore hole. However, Obara only shows an open bore hole extending through the entire length of the rotary shaft 5. Fukaya also discloses an open bore hole extending through the entire length of rotary shaft 12.

Independent Claim 4 further recites "an outer diameter of the nut being the same as or smaller than an outer diameter of the force application shaft". This is shown, for example, in Applicant's Figures 2 and 3 where the ball nut 21, 33 is received within the pressure application shaft 9 and thus has an outer diameter less than the outer diameter of the pressure application shaft. As discussed above, Obara does not have a nut attached to the force application shaft. Further, the ball nut 7 of Obara receives the screw shaft 9 therein and has a greater outer diameter than the screw shaft 9 as well as the moving arm 8 and electrode 10. Fukaya also shows the nut of the rotary shaft 12 receiving therein the screw shaft 7a and thus having a greater outer diameter than the screw shaft and force application shaft 7.

Independent Claim 5 further recites "the screw shaft being integrally provided on the rotary shaft by fixing the screw shaft to the rotary shaft utilizing a friction force". As discussed above, the rotary shaft 5 of Obara is not fixed to the screw shaft 9 thereof, much less fixed by a friction force. Likewise, the rotary shaft 12 of Fukaya is not fixed to the screw shaft 7, 7a.

Further there is no motivation, absent Applicant's specification to combine Fukaya with Obara.

Obara is drawn to a welding device. Fukaya is drawn to a step motor for use with a flow rate control valve as discussed at column one, lines 15-19 therein. It is unclear why one of ordinary skill in the art would look at the step motor of Fukaya in order to modify the arrangement for the welding gun of Obara.

Figures 2 and 3 of Fukaya are relied on to disclose the screw shaft 7 integrally provided on or fixed to the rotary shaft 12. This statement is not understood. As in Obara, the screw shaft 7 of Fukaya moves linearly in response to rotation of the female screw 12 provided on an inner portion of the rotor 11. Thus, the screw shaft 7 of Fukaya is not fixed to the rotary shaft 12, but moves linearly in response to rotation of the rotary shaft. Therefore, Applicant's claimed arrangement distinguishes the applied prior art.

The Office Action further indicates that the invention of Fukaya has the purpose of reducing the size of the embodiment and facilitating the manufacturing process. It is unclear to Applicant how the step motor of Fukaya facilitates the manufacturing process for the welding gun of Obara. Further, it is unclear how the arrangement of Fukaya would reduce the length of the arrangement of Obara. The disclosed arrangement of Obara already shortens the total length of the welding gun as discussed in the purpose of the abstract therein.

For the above reasons, independent Claims 3-5 are believed allowable over the combination of Obara and Fukaya.

Claim 1 is rejected under 35 USC § 103 as being unpatentable over Obara in combination with Fukaya and further in view of Kumatani (U.S. Patent No. 4 689 509). The driving unit of Claim 1 is believed distinguishable from the applied prior art for the following reasons.

Applicant's independent Claim 1 recites "a nut fixed with the force application shaft and threadably engaged with a screw of the screw shaft". For example, see nut 33 in Figure 3 which is fixed to the force application shaft 9 and threadably engaged with a screw of the screw shaft 7. This

physical arrangement is not present in Obara, Fukaya or Kumatani.

The rejection interprets the elements of Obara as follows. The rejection states that Obara discloses a screw shaft 9 coaxially fixed with a rotary shaft 5 of the motor, a nut 7 fixed with the force application shaft 9 and threadably engaged with a screw of the screw shaft 9. This interpretation is traversed. Thus, in the rejection, element 9 is both a force application shaft and a screw shaft. Further, the Office Action indicates the ball nut 7 is fixed with the force application shaft 9. This interpretation is traversed.

The nut 7 in Obara is fixed to the rotary shaft. Thus rotation of the rotor 5 and ball nut 7, which are integral with each other, provides reciprocal movement of the screw shaft 9. Therefore, the nut 7 of Obara is not fixed with the force application shaft as recited in Applicant's independent Claim 1.

Independent Claim 1 further recites "an elastic body disposed on the axis of the force application shaft". In the Office Action, Fukaya is relied upon to disclose an elastic body 9 disposed on the axis of the force application shaft 7 through which the force exerts. There is no motivation, absent Applicant's disclosure, to provide the coil spring 9 of Fukaya for the arrangement of Obara.

Independent Claim 1 further recites "an electromagnetic brake disposed on the rotary shaft of the motor". The Office Action relies on Kumatani to disclose an electromagnetic brake 42 disposed on the rotary shaft 26 of the motor.

There is no motivation to combine Fukaya with Obara as discussed above. Kumatani is drawn to a low inertia speed variable induction motor for industrial sewing machines as discussed at column 1, lines 14-17. Kumatani does not disclose a welding apparatus. Kumatani discloses the induction motor having an electromagnetic brake to control rotational speed for winding or unwinding. There is no disclosure of a reciprocating linear element in Kumatani. Thus, one of ordinary skill in the art would not look at the

induction motor for winding of Kumatani to modify the linear reciprocating welding gun of Obara.

For the above reasons, independent Claim 1 is believed allowable over the combination of Obara, Fukaya and Kumatani.

Pursuant to 37 CFR § 1.121, marked up copies of the amendments to the specification and amended Claims 3-5 are provided herewith.

Favorable reconsideration of this application and allowance of Claims 1, 3-5, 12-15 and 20 is respectfully requested.

Respectfully submitted,

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Encls: Marked Up Amendments to Specification
Marked Up Claims 3-5
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The paragraph beginning at page 8, line 5, is amended as follows:

Further, since the rotary shaft 5 and ball screw shaft 7 are separately provided, the combination thereof can be freely selected to enhance flexibility, assembly and maintenance thereof, thereby forming ~~-~~the driving unit of a welding equipment so ~~s~~as to serve a motor-operated welding equipment that is compact and ~~ash~~has an excellent operability.

The paragraph beginning at page 8, line 13, is amended as follows:

The fastening means utilizing a friction force is not limited to that utilizing a wedging operation as set forth above, but includes an apparatus ~~having a principle~~for generating pressure in liquid medium sealed in a sleeve and expanding the sleeve to perform fastening or the like.

The paragraph beginning at page 9, line 5, is amended as follows:

Other components of the driving unit of a welding equipment are substantially the same ~~of~~as those of the first embodiment, and hence they are depicted by the same reference numerals and the explanation thereof is omitted.

The paragraph beginning at page 9, line 14, is amended as follows:

As mentioned in detail above, since the ball screw shaft 7 is substantially integrated with the rotary shaft 5 and is positioned inside the servomotor 1, and also the bearing of the ball screw shaft 7 is shared by the rotary shaft 5 so that the driving unit of a welding equipment can be reduced by the length of the shared bearing compared with the conventional driving unit of a welding equipment so that the welding equipment is reduced in length and becomes compact. Further,

since the moment of inertia applied to the servomotor 1 is reduced, moving response of the pressure application shaft 9 and the welding electrodes caused by the servomotor 1 is remarkably enhanced. Still further, since the rotary shaft 5 and ball screw shaft 7 are separately provided, the combination thereof can be freely selected to enhance flexibility, assembly and maintenance thereof, thereby forming the driving unit of a welding equipment so ~~s~~as to serve a motor-operated welding equipment that is compact and ~~ash an~~has excellent operability.

The paragraph beginning at page 10, line 14, is amended as follows:

In Fig. 5, a rotary shaft 5 of the servomotor 1 is formed of a hollow shaft and is supported by the outer shell 2 of the servomotor 1 by way of bearings 6. Further, a ball screw shaft 7 is positioned in the core of the axis of the servomotor 1 and is fixed to the rotary shaft 5 by a power lock mechanism 32. A screw 8 of the ball screw shaft 7 is screwed with a ball nut 13 provided on the pressure application shaft 9 so that a rotary force of the rotary shaft 5 of the servomotor 1 is converted into a reciprocating motion so as to reciprocate the pressure application shaft 9. This construction is substantially the same as the fourth embodiment, and hence other components are depicted by the same reference numerals and the detail of the construction is omitted.

The paragraph beginning at page 10, line 24, is amended as follows:

The ball screw shaft 7 positioned in the core of the axis of the servomotor 1 and fixed to the rotary shaft 5 by the power lock mechanism 32 is extended rearward from the body of the servomotor 1 and is connected to a position detector 14.

The paragraph beginning at page 11, line 3, is amended as follows:

That is, a relatively large diameter gear 61 forming a driven part for transmitting the force (or torque) of the servomotor 1, is fixed to the ball screw shaft 7 between the front of the position detector 14 and the rear of the body of the servomotor 1. A relatively small diameter gear 62 forming a manually operating driving part for applying a turning torque to the gear 61 of the driven part is positioned eccentrically from the rotary central axis of the servomotor 1, and the gears 61 and 62 mesh directly with each other. The gears 61 and 62 may be connected with each other by way of a serrated toothed belt (not shown).

The paragraph beginning at page 11, line 11, is amended as follows:

A machining part 63 comprising, e.g., a ~~manually~~manual turning unit, such as a machining hole or machining projection, is formed on the gear 62 of the driving part so that the gear 62 is operated by a handle or the like by way of a ~~manually~~manual operating hole 64.

The fourth full paragraph at page 12, in the replacement specification, is amended as follows:

A gear 62 of a driving part for driving a gear 61 forming a driven part for transmitting the torque of a servomotor 1 is made standby when the servomotor 1 operates. That is, a returning spring 72 formed of an elastic body is biased in guide shaft 71 for holding the gear 62 to form a standby unit. The guide shaft 71 is ~~a h0latch input terminal LE~~formed in a housing 73 of a position detector 14 and ~~it is jounaled~~is journaled by a bearing 76 of a bearing holding member 75 screwed in the entrance of the hole 74. ~~Depicted by 77 is a manually~~A manual operating knob 77 and ~~78 is~~ a dust seal 78 are also provided.

3. (Twice Amended) A driving unit of a welding equipment provided with a force application shaft that is driven by a motor, comprising:

a screw shaft coaxially fixed with a rotary shaft of the motor;

a nut fixed with the force application shaft and threadably engaged with a screw of the screw shaft;

a stabilizing mechanism engaging the force application shaft to prevent rotation thereof;

whereby a rotary force output from the rotary shaft of the motor is converted into a reciprocating motion of the force application shaft which in turn applies a force to the welding equipment; and

wherein the screw shaft is ~~substantially~~integrally provided on the rotary shaft of the motor by boring a closed bore hole at an output side of the rotary shaft of the motor, and inserting one end of the screw shaft into the closed bore hole.

4. (Thrice Amended) A driving unit of a welding equipment provided with a force application shaft that is driven by a motor, comprising:

a screw shaft coaxially fixed with a rotary shaft of the motor;

a nut fixed with the force application shaft and threadably engaged with a screw of the screw shaft, an outer diameter of the nut being the same as or smaller than an outer diameter of the force application shaft;

a stabilizing mechanism engaging the force application shaft to prevent rotation thereof; ~~and~~

whereby a rotary force output from the rotary shaft of the motor is converted into a reciprocating motion of the force application shaft which in turn applies a force to the welding equipment, and

wherein the screw shaft is ~~substantially~~integrally provided on the rotary shaft ~~of the motor~~ by rendering the rotary shaft of the motor hollow to form a hollow portion and having the screw shaft penetrate the hollow portion to fix the screw shaft to the hollow portion.

5. (Twice Amended) A driving unit of a welding equipment provided with a force application shaft that is driven by a motor, comprising:

a screw shaft coaxially fixed with a rotary shaft of the motor, the screw shaft being ~~substantially~~integrally provided on the rotary shaft by fixing the screw shaft to the rotary shaft utilizing a friction force;

a nut fixed with the force application shaft and threadably engaged with a screw of the screw shaft; and

a stabilizing mechanism engaging the force application shaft to prevent rotation thereof,

wherein a rotary force output from the rotary shaft of the motor is converted into a reciprocating motion of the force application shaft which in turn applies a force to the welding equipment.